Payce

Proposed Development SOPA Site, Wentworth Point.

Transport Impact Study

Addendum

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Henson Consulting

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Henson Consulting
4 Farrar Street,
Balgowlah Heights NSW 2093
Telephone: +61 (0)408 249 743
Email: Colin.henson@bigpond.com

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1 Introduction

1.1 Scope of Report

Henson Consulting (HC) was commissioned by Payce in 2013 to undertake a traffic and transport assessment and advice for the proposed mixed use development comprising 3 buildings containing residential apartments above podium level commercial uses (SSD 14_6387) of the subject site, Sydney Olympic Park Authority (SOPA) site, The Wharf Site, "Dock", 1 Burroway Road at Wentworth Point.

A Transport Impact Study (TIS) and report dated May 2014 was prepared to address the issues considered in the planning stage of the project, including the Director Generals Requirements (DGR's) and to support a Development Application (DA) for the City of Auburn (Council), SOPA and UrbanGrowth NSW.

This Addendum to the TIS was prepared with reference to comments received from the Authorities. The current proposed development scheme for the site and roads has changed from the original TIS, and information in this Addendum based on the current scheme supersedes those parts of the TIS.

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1.2 Key Issues and Objectives

The amended configuration of the proposed buildings has been specifically designed to achieve the transport and access objectives, including:

- Significantly improved street activation in particular along the northern, western and southern facades.
- Improved road layout and through-site pedestrian link.
- Improved car parking, car parking access, servicing and loading dock arrangement and waste management

The objective of this Addendum is to address the comments from Authorities, particularly written comments as follows:

Figure 1: Summary of responses

Authority	Date of correspondence	Section in this Addendum
Auburn Council	Auburn City Council Comments, SSD 6387, Undated	2
Panning and Environment, NSW	31/7/2014	3
RMS NSW	13/6/2014	4
SOPA	18/7/2014.	5
TfNSW	1/8/2014	6

2 Auburn City Council Comments

2.1 Traffic Management

2.2 17. The traffic and transport study states on p. 30 that the site is inconvenient from a public transport perspective. Council agrees. However, this is inconsistent with the approach taken by the rest of the study (e.g. p.13 s.2.6) which justifies traffic and parking reductions based on proximity to public transport.

The TIS does not state that the site is inconvenient from a public transport perspective. Page 30 states inter alia that "The proposed development is appropriately located close to convenient pedestrian paths, crossings, bus stops, railway stations, and bike routes that link conveniently to local and regional shopping and dining, employment, schools and open space and recreation."

Furthermore, the Planning & Environment NSW website[1] states "The Wentworth Point Urban Activation Precinct is located at the northern end of Wentworth Point in Sydney's inner west. The 18 ha precinct will deliver thousands of new homes with easy access to public transport, shops, services and jobs and the many facilities and parklands of Sydney Olympic Park."

The future public transport, augmented by the Homebush Bay Bridge bus, rail, and bike connections, will improve significantly from the existing situation, and is wholly consistent with the approach taken in the TIS.

2.3 18. The study does not address the cumulative impacts on the regional road network from the additional development. This development should contribute to the required upgrades identified in broader studies for these growth areas north of Parramatta Rd.

The TIS was based on the Traffic Impact assessment[2] for the overall Wentworth Point UAP. That UAP report considered effects and upgrading of the wider road network. The study identifies the following intersections as being of significance in distributing the forecasted UAP development traffic on to the surrounding strategic regional/arterial road network:

- Hill Road with Burroway Road;
- Hill Road with Bennelong Parkway;
- Hill Road with Holker Street;
- Bennelong Parkway with Marjorie Jackson Parkway; and
- Australia Avenue with Bennelong Parkway and Sarah Durack Avenue.

That TIA study therefore informs discussions with Council over how improvements to these intersections will be delivered over time and in line with

[1] http://www.planning.nsw.gov.au/wentworthpoint

[2]Traffic Impact Assessment, Wentworth Point Urban Activation Precinct, Local Traffic Conditions, Traffix, Issue V, 13/7/2013.

future growth of Wentworth Point. The TIA report also identifies broader arterial road issues that are known to be of critical importance to both State and Local Government as well as local communities more generally, including existing residents within Wentworth Point itself. That is, the UAP Planning Proposal is premised upon a commitment to ongoing investigations to deal with the complex strategic road planning issues that exist in the locality, with solutions expected to be a shared responsibility. With regard to the strategic regional/arterial road network, the following key strategic intersections were identified. These strategic intersections, referred to as 'Gateway' intersections, provide the connections between the Wentworth Point local road network and the Sydney-wide strategic road network:

- Silverwater Road with Holker Street;
- Parramatta Road with Hill Road, including the M4 Motorway eastbound off-ramp and westbound on-ramp;
- Parramatta Road with Birnie Avenue; and
- Homebush Bay Drive with Australia Avenue.

Implementation of those UAP road works upgrades already addresses those wider issues within the higher bound traffic generation rates assumed in the UAP TIA. The effects of the subject site as they dissipate within the wider road network are covered by the UAP TIA assumptions and proposed works.

There are major improvements funded to the regional road network including new eastbound access from SOP to the M4 and WestConnex. We agree with the conclusion of Planning and Environment NSW[3] that "Any such assessment would need to be carried out as a broader strategic traffic study, and is beyond the scope of this proposal. Consistent with the new planning system outlined in the White Paper, it is expected that developments such as these would make contributions to fund necessary regional road upgrades over time as part of future processes including Subregional Delivery Plans and Growth Infrastructure Plans."

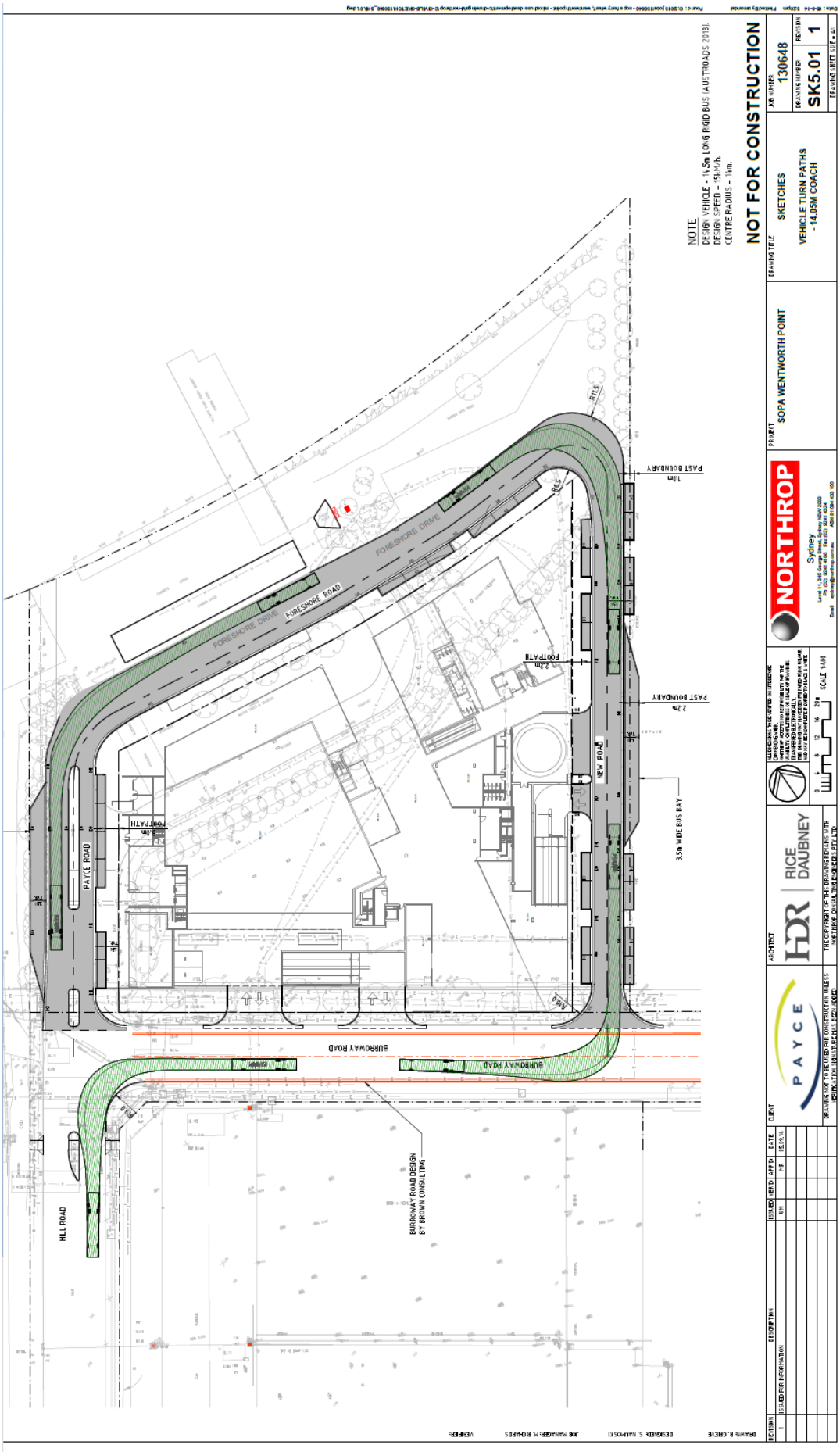
2.4 19. The road network must be designed to be accessed by a 14.5m coach for occasional services. Details should be incorporated in the design.

Agreed. The Civil Engineering Drawings (SK5.01) demonstrate that the currently proposed road network is designed to be accessed by a 14.5m coach for occasional service.

3

http://www.planning.nsw.gov.au/Portals/0/DeliveringHomes/Wentworth_Point_Finalisation_Report.pdf Section 5.3 Traffic Study

Figure 2: Bus Turn Paths - 14.5m Coach.



2.5 Eastern Road beside School

2.6 20. The landscape plan shows the eastern road as a future road. Another plan shows a temporary road to the north, with a cul de sac at its end.

See current plans, for example Figure 2 above.

2.7 21. It is critical that this road be built in time for the opening of the school, planned for the beginning of 2017. Its construction must be included as part of this development.

Agreed.

2.8 22. The plans also show a 3m wide section of this road (road verge) on the school site. Council's representative on the Project Control Group for the school advises that the Department of Public Works has stated that the school boundary is the SOPA boundary, and that the road carriageway will be fully provided within the SOPA site.

It is understood[4] that the school authorities have undertaken to allow the road to extend 3m within the school site, as shown in Figure 2.

2.9 23. From a practical on-going management standpoint the road should be in single ownership. It is critical that Urban Growth, DEC and SOPA meet to resolve this issue.

Agreed.

2.10 Hill Road

2.11 24. Similarly, there is no footpath area beside the bus bay proposed on Hill Rd adjoining the development. This would leave the road verge to be created by the adjoining urban activation precinct. This is not included in any of the concept planning for the UAP. The road and its verges should be totally within the SOPA precinct.

The western lane on Hill Road north of Burroway Road is a bus layover facility, and is not intended for pick-up or set-down of passengers in either everyday operations mode or special event peak operations mode. There is a parallel

[4] Payce instruction

dedicated wide shared path immediately to the west, extending from the foreshore to SOP. A footpath on the verge here would may just confuse potential bus passengers where to wait, and would not improve pedestrian safety or convenience.

Figure 3: Shared Path to the west side of Hill Road, viewed to the north from Burroway Road

2.12 Road widths

2.13 25. The road widths are inadequate. On street parking is shown at 2.1m. 2.3m is required in accordance with the relevant Australian Standards

The effective width of parking bays is also influenced by the width of the adjacent travel lanes. As shown in the Civil Drawings including figure 2 above, the on-street parking bays have been widened to 2.3m wide. This is considered generous.

2.14 PARKING AND LOADING

2.15 29. For the residential area only 246 car parking spaces are proposed for 256 units. This is inadequate and according to the EIS does not even meet the minimum standards of the SOPA masterplan. The masterplan rates were designed with the intent to reduce car use due to the proximity of the railway station. This does not apply to this site. While there is access to the ferry,

public transport accessibility cannot be considered to be similar to the rest of the SOPA site.

See above Section 2.2 comments on convenient connections to public transport.

The current subject site proposal is increased to 334 residential car spaces for 256 residential units. There is also opportunity for residential visitor parking in the retail and on-street car parking bays. Parking rates are higher than the current maximum of one per dwelling used in West Rhodes, and advocated for the Wentworth Point UAP Finalisation Report by the City of Canada Bay. The proposed car parking is considered adequate.

2.16 30. Note that the parking details shown on the traffic report (page 29) are different to the planning report (page46).

Agreed. The differences were due to late changes, and are not substantive in terms of transport impacts.

2.17 31. At a minimum the SOPA standards should be met. However, given the constant complaints about parking that Council receives from residents of Wentworth Point, and the very real parking issues experienced by residents and visitors to this area, it would be more appropriate to use the same parking provisions as those in the draft Wentworth Point DCP (as amended and being finalised currently by the Department of Planning and Environment) or Council's DCP.

Car parking provision is considered appropriate for the future public transport, car ownership, and sustainability objectives for the site.

2.18 32. The number of bicycle spaces does not meet the requirements of the Sydney Olympic Park Masterplan, with only 146 provided, rather than the 481 required by the masterplan (page 29 of Traffic report). Further, the planning report (page 55) – Transport management states that the occupants will use cycles to access the major events in Olympic Park and also relies on the future use of Homebush Bay bridge. Given the prominence given to cycling in the transport study, bicycle parking in the proposed development should, at a bare minimum, meet the requirements of the masterplan.

80 retail and visitor bicycle spaces and 66 residential bicycle spaces are proposed. Further bike parking is provided in storage units. The proposed development has been amended to increase storage provision for the apartments which complies

with the requirements of the Masterplan and the RFDC. The storage cage can be increased in size and to comfortably accommodate a bicycle.

2.19 33. The submitted traffic report indicates that there will be two loading bays (HRV & MRV) for the retail area. The submitted plan does not indicate the two loading bays. Two loading bays should be shown on plan with appropriate turning circles to ensure that both can function independently.

The revised scheme provides bays for one retail MRV and two retail SRV's in the Retail dock off Burroway Road, and one MRV waste vehicle on a turntable accessed off the New Road. Turning circles as shown as follows.

Figure 4: MRV Turning circle for Retail Dock

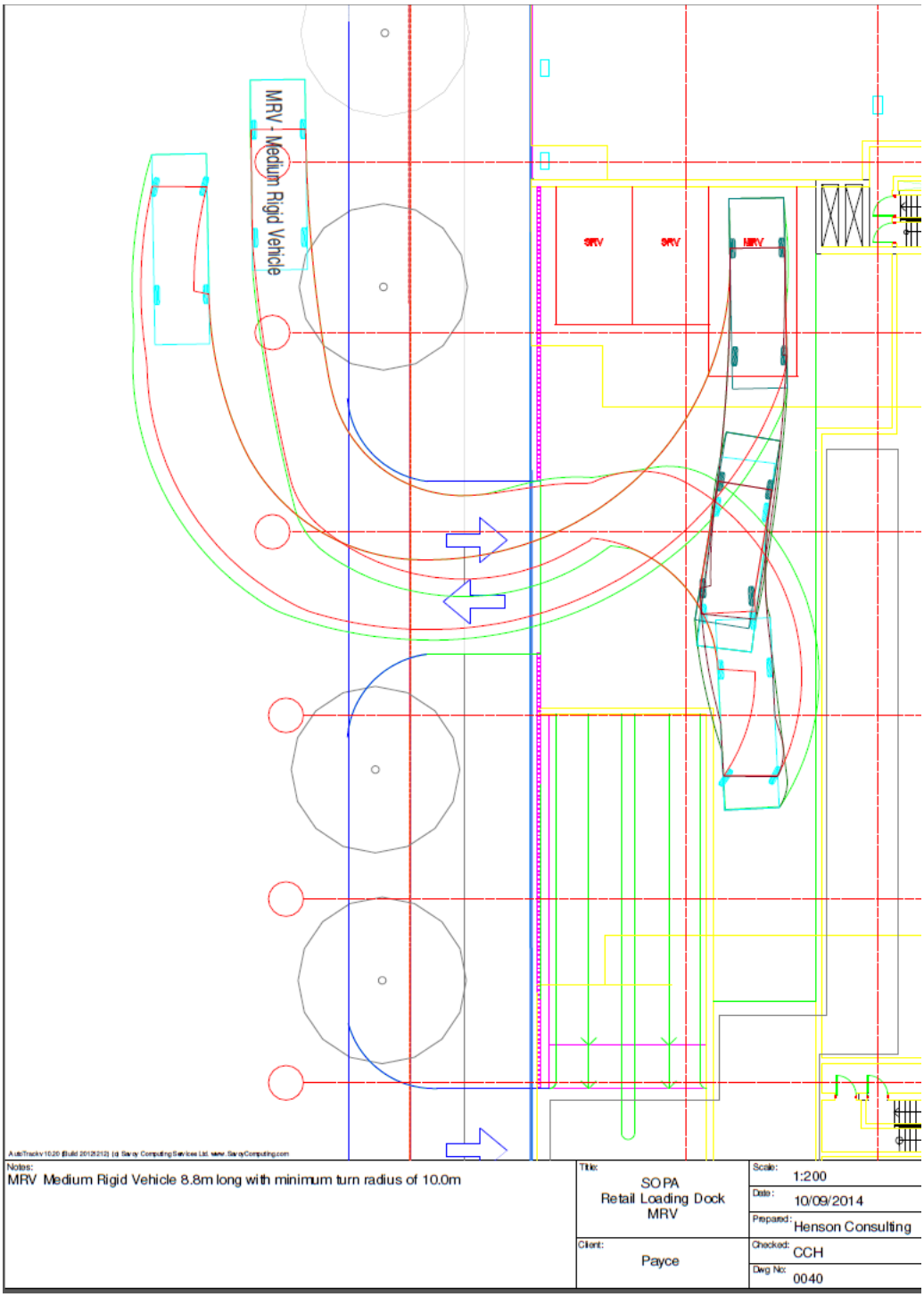
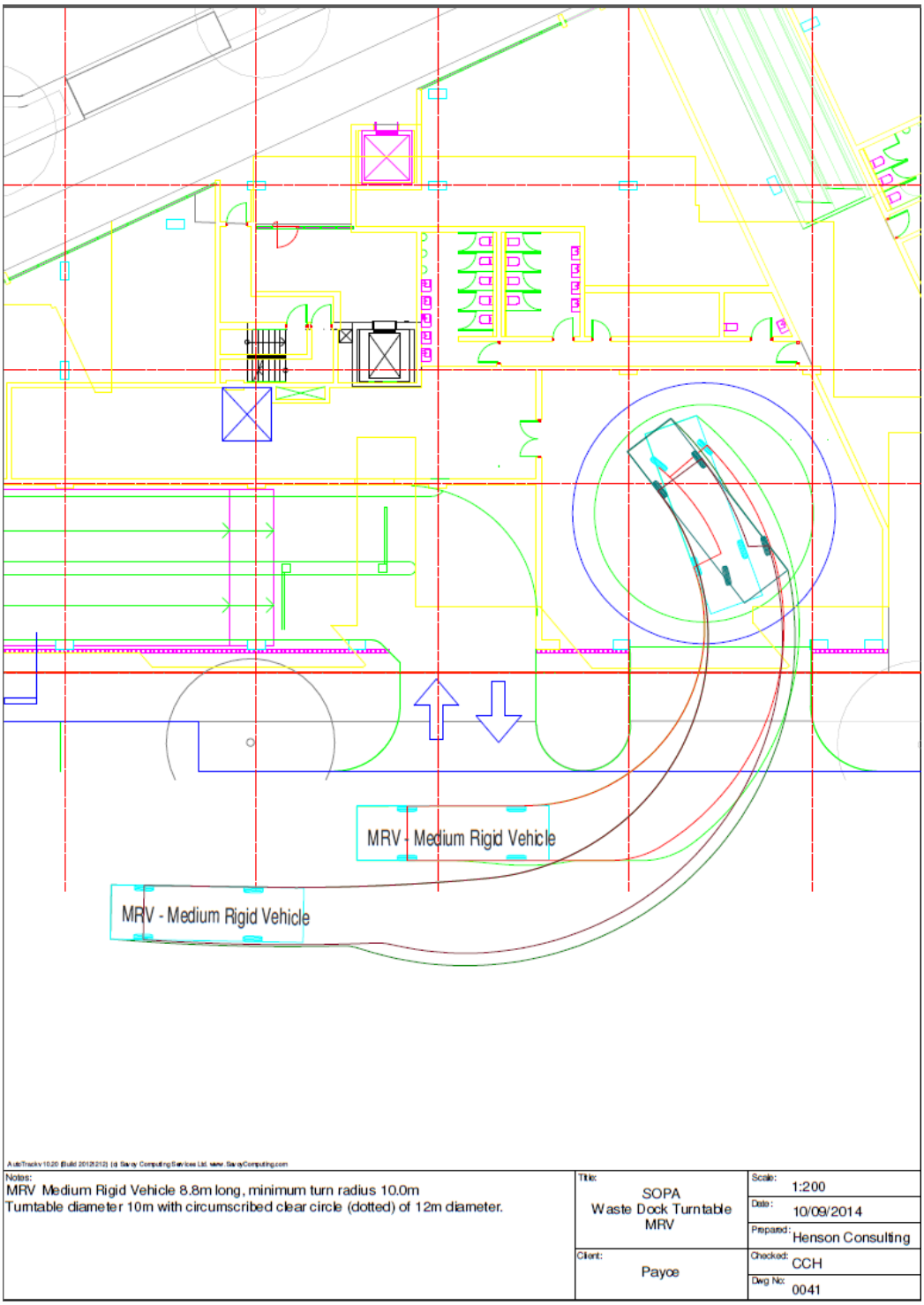


Figure 5: MRV Turning circle for Waste Dock turntable.



2.20 34. In addition to the major retail, loading bay requirements for the other shops and child care facility have not been addressed.

Loading for these other uses will share the loading bays, with suitable security and safety controls.

2.21 35. The minimum head room requirement must comply with AS 2890.2.

A minimum headroom of 2.3m is provided in car parks and 4.3m over both loading docks, the maximum legal height of a road vehicle. 4.5m headroom will be provided if this is feasible within other height constraints.

2.22 36. Please note that Council DCP requires one loading space per 400m2.

The Auburn DCP 2010 requires loading shall be provided at a rate of

- Business and office premises: 1 space per 4,000m2 GFA up to 20,000m2 GFA plus 1 space per 8,000m2 thereafter
- Retail premises - shops and food and drink premises: 1 space per 400m2 GFA up to 2,000m2 GFA plus 1 space per 1,000m2 thereafter
- Other: 1 space per 2,000m2

It is not possible to establish criteria for the size of trucks likely to access the land uses specified above. This will be done on a case by case basis.

1751m2 of Supermarket and 1487m2 of Specialty retail plus 536m2 of childcare centre totals 3774m2. This requires five bays for the first 2000m2 plus another two bays for the remaining, a total of seven bays. Usual practice is to provide half of these bays for trucks in loading docks and half in car parks for utes and couriers and small vans. These will be provided in two MRV bays and two SRV bays in the loading docks, and three shared visitor spaces for utes and vans in the car park.

2.23 CONSTRUCTION MANAGEMENT

2.24 37. The Construction Management Plan must address the parking of construction vehicles. The plan should ensure that no construction vehicle is kept on street waiting or parking prior to entering the site.

Agreed. To be provided when required.

2.25 CYCLEWAY

2.26 38. Hill Rd cycleway

2.27 • The current traffic management scheme line marked on ground in Hill Road is based on a Masterplan for Bennelong Parkway and Hill Road jointly prepared by Council and Sydney Olympic Park Authority (SOPA) in 2004. This scheme includes on-street bicycle lanes. However, following a consultation meeting with the Wentworth Point community held in March 2012,

Council decided to review the scheme proposed for Hill Road in conjunction with SOPA with a view of providing more on-street parking for residents. Council has now deferred the Hill Road Traffic Management Scheme to accommodate the impacts of increased future traffic following a traffic/transport study to be undertaken for the Urban Activation Project proposed for the Maritime Land in Burroway Road. In the interim, Council has prepared plans for a proposal to remove the on-street bicycle lanes and to provide parking on both sides of Hill Road. This matter may be included in the August Councillor briefing. The final configuration of Hill Rd will depend on the recommendations of the broader traffic and transport study to be undertaken for the UAP.

Noted.

2.28 WASTE MANAGEMENT

2.29 53. Council has concerns about the location of the main waste handling room so close to the vehicular access to the development. Council's position is not (as stated in the EIS) that waste collection is to be on road. Rather, Council seeks on-site waste collection.

The revised scheme provides on-site waste collection. The residential waste dock is operated using a truck turntable in a waste dock off the New Road. The retail and commercial waste dock is off Burroway Road.

2.30 RESIDENTIAL

2.31 54. Waste must be collected on site. Council has consistently applied this requirement in all recent developments in the Wentworth Point precinct. The planning report indicates that Council was consulted about this. Council does not object to collecting the garbage at street level provided: • The collection vehicle can be within the development site while loading; • The collection access point to the development is via the new proposed road, and • A minimum 4.0 m head room is required.

The proposed waste loading dock satisfies these requirements.

2.32 55. It is noted that the ground floor level waste area does not have any manoeuvring space for bins. The bin wash area is accessible only when significant amount of bins are removed from the area. Council seeks that these matters be addressed.

The waste area layout has been revised to satisfy these requirements.

2.33 COMMERCIAL

2.34 56. Commercial waste collection has not been addressed in the submitted waste management plan. The commercial waste collection area must be shown on the plan. Please note that: • The commercial waste collection facility must be separated from the residential facility; • The facility must be easily accessed by all shops and the child care facility; • Waste must be collected on site; • A minimum 4.0 m head room is required.

The dock area has been revised to satisfy these requirements.

3 Department of Planning and Environment Comments

3.1 The Design of the new road should be revised to ensure that ,in combination with the three metre setback on the adjoining site to the east, it can accommodate two lanes of traffic , two parking lanes, and two footpaths in accordance with the Wentworth Point Precinct Master Plan 2013.

The Revised Proposal complies.

3.2 Servicing areas and retail uses are to be reconfigured to improve activation along the site boundaries, in particular Foreshore Drive.

The Revised Proposal complies. Kerb lengths dedicated to access to servicing have been reduced.

3.3 The design of the servicing areas are to be revised to ensure that all waste removal is undertaken on-site.

The Revised Proposal complies , see Sections 2.28-2.34 above.

4 RMS NSW Comments

4.1 RMS raises no objection

Noted.

5 SOPA comments

5.1 Storage and Bicycle Parking

5.2 The SOP MP and the Residential Flat Design Code RFDC both identify specific storage requirements for residential units. It is noted that the submitted EIS suggests that 4m3 is proposed to be provided to each unit. This is significantly below the identified targets and is further compromised by the lack of separate bicycle parking. The SOP MP requires 1 bicycle space per unit (in addition to visitor) which is proposed to be provided in the basement storage cages of each individual unit. This is considered to only be acceptable where the unit storage requirements are in excess of the SOP MP and RFDC. The proponent should be requested to address this non-conformance.

The Revised Proposal complies.

5.3 Ground Level Activation

5.4 The development has focused ground level activation on the through-site-link at the expense of the rest of the development. The frontage to Hill Road, extended, is dominated by loading docks, substation access and other plant. Burroway Road provides some activation but has a large expanse dedicated to vehicular access and the loading dock. New Street which will interface with a new primary school is dominated by garbage store, access ramps and outdoor play space for the childcare centre which will likely be screened for privacy. Foreshore Drive is surprisingly lacking activation when it has a northerly aspect and significant views over the Parramatta River. To provide greater activation to New Street the garbage store should be relocated to the basement with the loading dock utilised for collection, it is noted that the SOP MP requires collection of garbage to occur onsite. The remnant space should be incorporated into the adjoining retail tenancies or additional tenancies provided. Details of screening for the childcare centre should also be provided.

The Revised Proposal complies.

6 Transport for NSW comments

6.1 The Transport Impact Study, prepared by Henson Consulting May 2014, does not go into enough detail to allow the reviewer to determine project traffic assignment. It would help when the consultant revises the Transport Impact Study if existing traffic, background traffic and project traffic were presented as in Attachment 2.

See Tables below.

6.2 TfNSW appreciates the applicant's attempt to support public and active transport within the subject development site. The loop road around the development will provide access to the ferry wharf for regional-level bus services as well as providing access to adjoining Urban Activation Precinct (UAP), development sites. The loop road will have functions beyond the local access needs of the development itself and the dedicated roads should be designed to handle the traffic needs of the transport interchange given the known future development on adjoining UAP sites fronting these roads. As such, TfNSW provides the following comments to support efficient, safe vehicular movement and pedestrian access:

The traffic generation of the revised proposed development is shown in following table. The driveways to the Retail car park and Retail loading dock are now located mid-block on Burroway Road. The driveways to the Residential car park and Waste loading dock are now located mid-bloc on New Road. These driveways locations places retail access with more convenience and visibility from Hill Road. The residential access on New Road is more suited to regular residential users. All driveways are located mid-block, away from traffic intersections and the busiest pedestrian flows across the site and adjacent intersections.

The upper bound nature of these traffic generation rates is noted in the UAP TIA[5] report as follows:

With regard to development impacts, the assessment adopted for this report is based on an adjusted high density residential trip rate of 0.35 vehicle trips per hour per unit during peak periods, as adopted in the study terms of reference. This reflects a 'worst case' scenario that does not fully take into account the benefits that will flow from a number of public transport initiatives, in particular, the

[5] Quote from UAP Section 1.2

introduction of additional bus services, ferry enhancements and construction of the proposed Homebush Bay Bridge – which have all been disregarded from this study. The trip rate of 0.35 is significantly higher than other renewal areas, such as Rhodes for instance which, being closer to rail, adopts a trip rate of 0.29 trips per unit. The full potential of these alternative transport improvements (the benefit of which being reduced trip rates) has not been assessed in this study, in order to consider a worst case traffic planning scenario.

This therefore provides a 'safety margin' in terms of the conclusions in this report relating to road improvement works.

Figure 6: Traffic Generation of Revised Proposed Subject Site Development

Parking Space Requirements and Provision						**Traffic Generation per hour**										
Recalculations 10 September 2014	Units	Rate	Car parking spaces required	Car parking provided spaces	Bike parking provided spaces	a.m. rate	total	%in	%out	in	out	p.m. rate	total	%in	%out	in	out
1 bed 1	58.0	1.0	58.0														
2 bed 1.2	179.0	1.2	214.8														
3 bed 1.5	19.0	1.5	28.5														
Total resident units	256.0		301.3	334.0	66.0	0.4	89.6	0.2	0.8	17.9	71.7	0.4	89.6	0.8	0.2	71.7	17.9
Residential Visitor 0.25	256.0	0.3	64.0														
Child care * m2	536.0	69.0	children			0.4	27.6	0.5	0.5	13.8	13.8	0.4	24.2	0.5	0.5	12.1	12.1
Supermarket m2	1751.0					0.2*15.5/100	54.3	0.5	0.5	27.1	27.1	15.5/100	271.4	0.5	0.5	135.7	135.7
Retail	1487.0					0.2*4.6/100	13.7	0.5	0.5	6.8	6.8	4.6/100	68.4	0.5	0.5	34.2	34.2
Total Retail m2	3774.0			111.0	80.0					47.8	47.8					182.0	182.0
Retail and Other visitors																	
Commercial						2/100		0.8	0.2			2/100		0.2	0.8		
Total				445.0	146 plus at-grade					65.7	119.5					253.7	199.9
Notes:																	
* RMS GTTGD Table 3.6 : 7.8m2 per long day care child ie 536m2/7.8m2=69 children (high becuase some area outdoor). Same as UAP:0.4 trips per hour /7.8m2 per child = 1 trip per 20m2						UAP rate , includes service and loading		UAP split	assumes all via car park, off street			UAP rate		UAP split			
note some of these trips are bike trips																	
Service vehicle trips are included in overall rates, and TCU offset by bike vehicle component																	

6.3 Modelling • Enough detail to determine project traffic distribution and assignment needs to be provided to allow for detailed intersection analysis.

Traffic distribution and assignment was shown in the SIDRA volumes, and has been revised for the Revised Proposal changes and changes requested by the Authorities in the tables below.

6.4 • The Wentworth Point UAP Traffic Impact Assessment was utilised for background traffic. With a primary school, supermarket and child care facilities on the eastern side of Hill Road, background traffic from Wentworth Point UAP and Homebush Bay West developments should be reassessed to assign trips to the land uses east of Hill Road. The new Primary School is anticipated to attract additional trips from both developments. •

The UAP traffic assessment scenarios included traffic generated by the new primary school in Wentworth Point. In response to the TfNSW comment above, 10 vehicle trips per hour in each direction have been reassigned to and from the area west of Hill Road to the retail car park, and the same number to the primary school area east of New Road.

6.5 TfNSW advises that the traffic modelling does not appear to include the forecasted traffic generation from the finalised Homebush Bay West Development Control Plan Amendment No.1. Homebush Bay West Development Control Plan Amendment No.1 allows for an additional 1,300 dwellings in the site known as the Wentworth Point Planning Proposal.

The previous modelling included this extra traffic, specifically the share of that extra traffic assigned to the Bridge Boulevarde. See TIS page 33 Footnote 19

The Traffix Report page 65 states*: Four development 'thresholds' have been identified, which provide a program for the implementation of the recommended improvements schemes. These thresholds take into consideration all 7,200 future residential units earmarked for Wentworth Point and do not distinguish between the subject UAP site of 2,300 units and the remaining units on the Fairmead site.*

Threshold Four: 4,350 units – Equivalent to the traffic generation of 75% of the combined UAP and remaining Fairmead development (excluding proposed uplift which is addressed via the Homebush Bay Bridge).

As a result of this mode shift away from car driving (across the entire Wentworth Point site), the CattellCooper TMAP demonstrates that the uplift in development of 1,300 units from the 'no bridge' threshold of 3,500 remaining units to a 'post bridge' threshold of 4,800 units would have no material impact on traffic generation as the mode shift across the entire site would offset the traffic generation anticipated for the 1,300 units.

Note that the intent of this analysis was that the Homebush Bay Bridge allowed the uplift i.e. it moved sufficient people out of private cars into other modes in order to make no net difference to the traffic generation of the whole of Wentworth Point.

This is regarded by Henson Consulting as an excessively safely high test case given the above and the high traffic generation rates applied to the land uses.

However, in order to stress test the network, Henson Consulting have allowed an extra factor over and above this, as requested by TfNSW above. A 5% increase has been applied to the Traffix Cumulative Test Scenario Peak hours in the following table.

6.6 The additional development approval was on the basis of provision of the approved Homebush Bay Bridge. TfNSW requires the revised traffic modelling results to demonstrate the potential impacts to bus services operating on roads within and around the bus and ferry interchange.

The TIS modelling included this extra traffic, specifically the share of that extra traffic assigned to the Bridge Boulevarde. See TIS page 33 Footnote 19*: 20 buses per weekday peak hour, 10 in each direction(Arup estimate), 50% circulating via Wentworth Point ferry interchange.*

Bus traffic is specially included in this Addendum and the following table, where 5 additional new buses per hour from the HBB have been circulated via Hill Road north to the Wentworth Point ferry wharf bus interchange. The other 5 additional new buses per hour have been circulated to SOP via Hill Road south. In order to simulate buses setting down passengers early, two buses per hour recirculated via New Road and a right turn from Burroway Road to Hill road north to the ferry wharf interchange to pick up passengers.

6.7 TfNSW advises that the traffic modelling should be revised to include the additional forecasted traffic generation.

Traffic modelling has been revised to reflect the above issues. The results are summarised as follows, with SIDRA intersection analysis in the Appendices.

Figure 7: Summary of traffic flows-a.m. peak hour

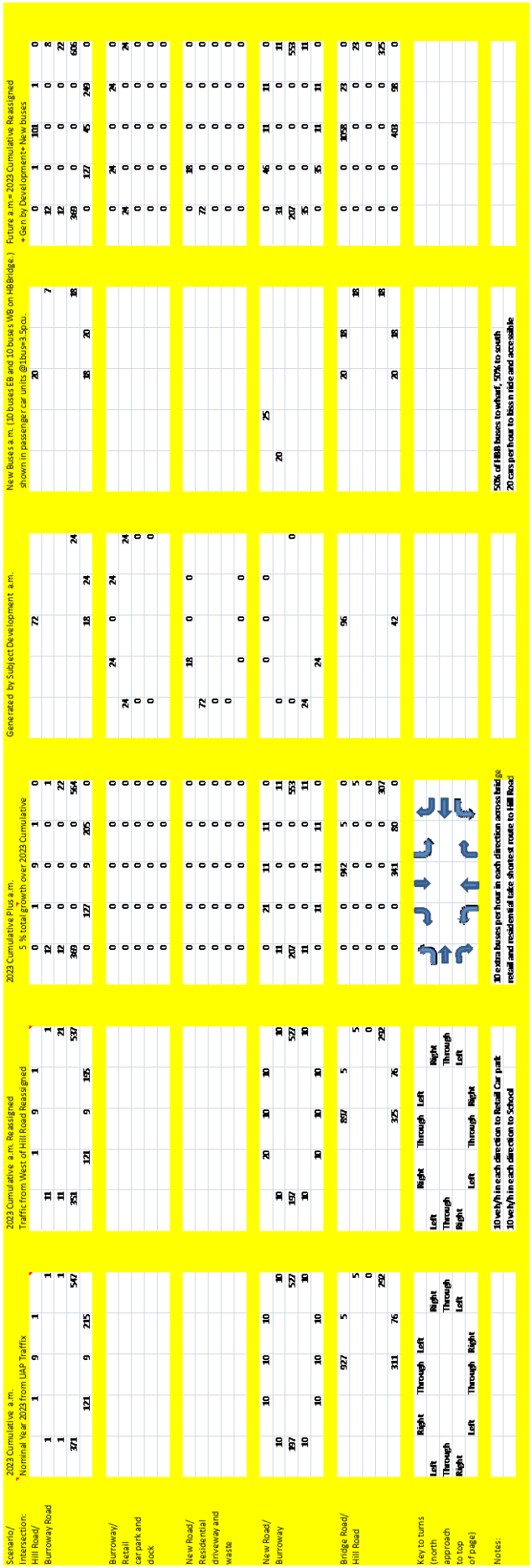
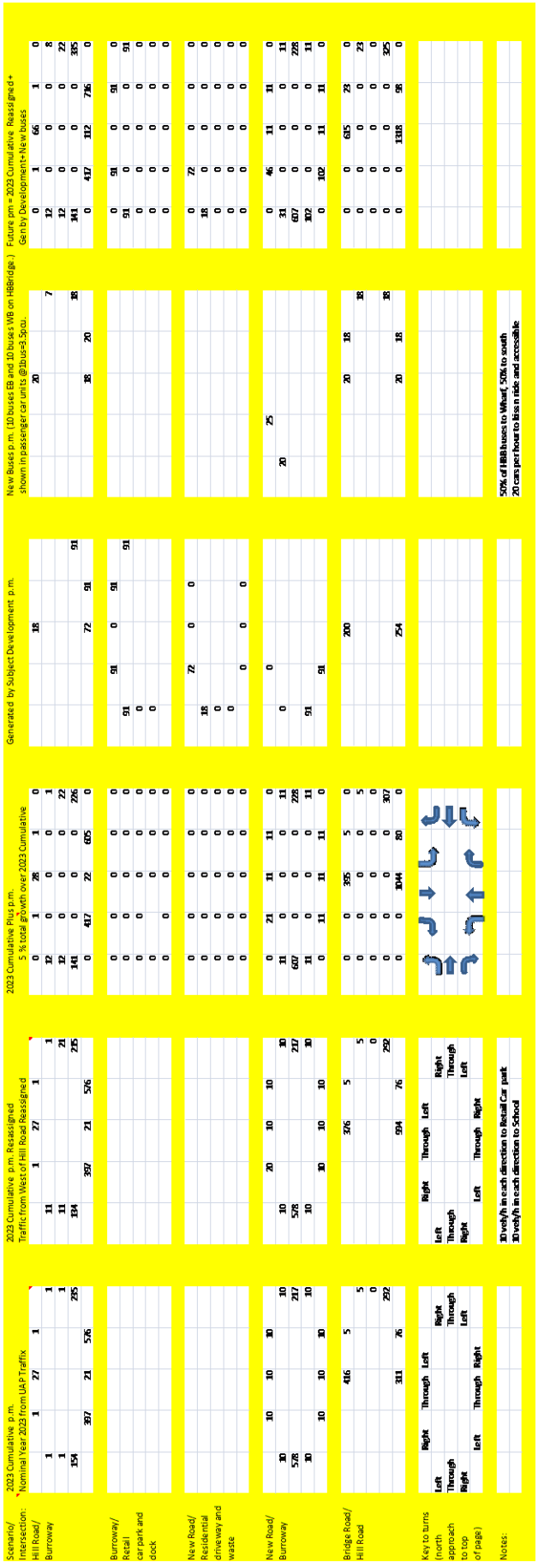


Figure 8: Summary of traffic flows - p.m. peak hour



6.8 Project traffic assignment does not appear to match the background plus development SIDRA models. There appears to be trips unaccounted for at the intersection of Hill Road and Burroway Road (see Attachment 2).

See tables above for the Revised Proposed subject scheme.

6.9 Intersection of Burroway Road and Hill Road. TfNSW has concerns the future intersection, as proposed in the Wentworth Point UAP Traffic Impact Assessment will not be able to support safe and efficient transport movements with the changes to the existing interchange configuration plus the additional traffic generated by the proposed development. • It appears the design of the intersection approved under the Wentworth Point UAP was based on modelling which does not include the forecasted traffic generation from the additional 1,300 dwellings allowed under the now finalised Homebush Bay West Development Control Plan Amendment No.1. • TfNSW is concerned buses may block this intersection, especially during Special Events. During Special Events, up to 50 buses per hour will use this intersection to drop off and then pick up passengers. It is estimated up to 20 buses per hour could layover. o Provide SIDRA documentation demonstrating the proposed intersection's queue lengths are able to accommodate turning movements of at least two 14.5m buses. • Demonstrate the proposed intersection of Burroway Road and Hill Road will be able to safely and efficiently cater for all vehicular and pedestrian traffic with the approved and proposed development.

See SIDRA analysis for the weekday a.m. and p.m. peak hours in the Appendix to this Addendum.

The Special Event operations would be subject to special transport management arrangements as is currently the case. Clearways are implemented, Special Event parking restrictions are implements. The adjacent properties including the subject site development are aware they may be conditioned to avoid deliveries and lose some access during Special Events. As major wide roads without kerbside parking, there will be adequate layover and intersection capacity. There is Special Event layover capacity for at least 20 buses per hour to layover in Hill Road.

A separate SIDRA analysis of a Special Event as described by TfNSW was applied to the key junctions, and is presented at the end of the Appendices. 50 buses per hour were added to the key movements shown as follows:

Figure 9: Special Event SIDRA Intersection Analysis Summary

Movement	Special Event Buses per hour added	Level of Service (LOS)	95% back of queue (metres)
northbound through approach of Hill Road to Burroway Road	50	A	10.5m (Leaving adequate additional length to queue more than two 14.5m buses)
southbound right turn from New Road into Burroway Road westbound	50	A	4.3m (Leaving adequate additional length to queue more than two 14.5m buses)
westbound left turn from Burroway Road westbound into Hill Road southbound.	50	A	51.9m (Leaving adequate additional length to queue more than two 14.5m buses)

All of these key bus movements still operated at LOS A with the 50 extra buses added to the everyday traffic and parking, even without Special Event management.

It is therefore concluded that the proposed road network can accommodate Special Events.

6.10 Intersection of Burroway Road and New Road There is insufficient information to determine whether the intersection of Burroway Road and New Road will operate adequately to ensure safe and efficient operation, given likely future pedestrian and traffic generation from the site, as well as potential traffic from the adjoining school site. • The SIDRA modelling results for the PM peak for this intersection do not appear to be included in the traffic assessment, which is necessary for TfNSW to undertake a comprehensive assessment on public transport and vehicle impacts.

Full SIDRA analysis included in the Appendix

6.11 TfNSW is concerned buses may block this intersection, especially during Special Events. During Special Events, up to 50 buses per hour will use this intersection to drop off and then pick up passengers. It is estimated up to 20

buses per hour could layover. o Provide SIDRA documentation demonstrating the proposed intersection's queue lengths are able to accommodate turning movements of at least two 14.5m buses. • Demonstrate the proposed intersection of Burroway Road and New Road will be able to safely and efficiently process all vehicular and pedestrian traffic with the approved and proposed development.

SIDRA diagrams are provided in the Appendix.

6.12 The pedestrian crossing arrangements across Burroway Road at the intersection of Burroway Road and New Road is unclear. o Demonstrate through pedestrian movement performance modelling at this intersection and that pedestrian movements are safe and efficient between the school, Wentworth Point UAP and Homebush Bay development south of Burroway Road. o The requested analysis should be undertaken for both the AM and PM Peak Periods.

Summary pedestrian analysis was provided in the TIS, section 4.3.

Pedestrian and bike generation from the development will be able to circulate via the public pathways that exist to the site. These flows will be substantial, but are estimated to be of an order that can be accommodated at acceptable levels of service on the existing and planned shared path and pedestrian footpath network without detailed capacity analysis. For example, the maximum pedestrian demand peaking flow might reasonably be associated with the school or the simultaneous arrival and unloading of two full 200 passenger ferries and two full 60 passenger buses, a total of 520 persons in a five minute period. This is less than the capacity of a 3m wide footpath at a good Fruin Level of Service C of 50 persons per metre width per minute of 750 persons per five minutes.

The intersection of Burroway Road and New Road is proposed to be controlled by Give Way controls on the Burroway road approaches. This will also assist the flow of buses southbound turning right into Burroway Road. Pedestrians in the predominant north-south flow would be aided by tis arrangement. The detail design of Burroway Road, currently a wide four lane road, is not the responsibility of the developer of the subject site, and final design of the road and medians crossings would be determined by SOPA and Auburn Council.

The above pedestrian analysis has been expanded linearly from 520 persons per 5 minutes to 6240 persons per hour, say 50% of whom might want to cross Burroway Road east and west of New Road, 1560 persons per hour at each crossing point. The SIDRA analysis shown in the Appendix shows that there is adequate capacity and acceptable delays.

6.13 Foreshore Drive TfNSW has concerns with the proposed design of Foreshore Drive. This road will provide access and egress to all vehicle and bus movements to the ferry

wharf, as well as commuter bus services, school drop off/pick up, and residential traffic. • Demonstrate the turning movement into the loading dock, just north of Burroway Road, will not impede the movements at the intersection of Burroway Road and Hill Road. •

The Revised Proposed scheme loading docks have been relocated, and turning paths plots to these docks are provided above.

6.14 TfNSW notes the desire line for pedestrian movements across Foreshore Drive to the ferry wharf. o TfNSW requests that Council and the local traffic committee be consulted to determine treatment for safe and efficient movement for pedestrians and buses at an appropriate location. o TfNSW advises it does not support raised platforms at this location.

A simple non-raised crossing of the Foreshore Drive is supported. The detail design of this crossing is subject to further consultation that has not been completed.

6.15 • TfNSW advises for safe and efficient traffic movements, the width of all traffic lanes proposed to accommodate buses should be a minimum of 3.5 metres. The width of any proposed bus stands and kerbside lanes used for bust stop/layover should also be a minimum of 3.5 metres.

The Revised Proposal complies. See above representative Civil Engineering Drawing.

6.16 New Road As with Foreshore Drive, TfNSW has concerns with the proposed design of New Road. This road will provide access and egress to all vehicle and bus movements to the ferry wharf, as well as commuter bus services, school drop off/pick up, and residential traffic. • TfNSW notes that the design of New Road does not appear to be consistent with the Wentworth Point Precinct Master Plan (see Attachment 3), in providing the necessary width of carriageway and parking. o It is recommended that the design of the road be amended to comply with the Master Plan, also taking into account necessary lane widths for roads to accommodate buses (being a minimum of 3.5m). o The Master Plan necessitates the New Road corridor to be 16m wide, comprising 13m on the subject development site and 3m

on the adjacent Maritime site. • TfNSW advises that New Road should have a parking lane along its eastern side to accommodate a school pick up/drop off zone of adequate size and sufficient space for two 14.5m non-rear steer buses including draw in/out. o The width of this parking lane should be a minimum of 3.5m. This would remove any impediment to buses using the travel lane on New Road, caused from school buses overhanging in the travel lane. • Kiss and ride facility patrons must access the facilities via New Road. Therefore, way finding signage should be provided to direct patrons of the kiss and ride facility to turn right into Burroway Road from Hill Road when approaching from the south.

The Revised Proposal complies. See above representative Civil Engineering Drawing. Way Finding signage will be provided.

It appears from the supporting documentation that the child care facility may have privacy fences surrounding the property. TfNSW is concerned north bound cars on New Road may not have adequate sight distance when turning onto Foreshore Drive. o Demonstrate adequate sight distance lines are achieved, as per the Austroads Guidelines.

To be advised by Civil Engineer when final drawings are available.

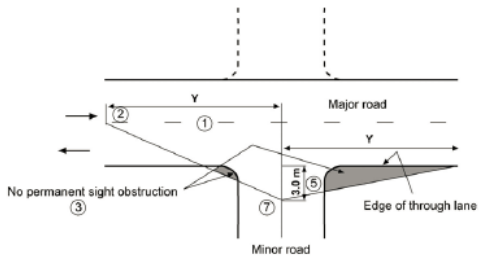
Note that the corner of Foreshore Drive and New Road is not strictly an intersection, but rather a sharp bend in a continuous road with no intersecting roads or local driveways etc but there may be some bus and car parking and unparking manoeuvres close to the corner. there is no pedestrian crossing either: pedestrians should cross Foreshore /Road at the ferry wharf or cross New Road at Bennelong Road. As such the Austroads requirements[6] apply of : *provide adequate warning of the presence of the intersection or crossing through clear sight lines and/or appropriate signage and provide adequate sight distances between conflicting road or rail users*

However, application as shown in the following diagrams of intersection Stopping Sight Distance as per Austroads Figure 3.2 sight distance restrictions requiring use of stop signs with a major road speed of 50km/h (worst case) on Foreshore Drive and consequent distance along major road of 30m, from a viewpoint 3m back on the centreline (in this worst case , choose property line extended) of the New Road, there is no permanent sight obstruction to approaching traffic on Foreshore Road centreline. Childcare fence sightlines should not be an issue.

[6] Austrods Guide to Traffic Managmenen Part 6

Figure 10: Sightline analysis

GUIDE TO TRAFFIC MANAGEMENT PART 6: INTERSECTIONS, INTERCHANGES AND CROSSINGS

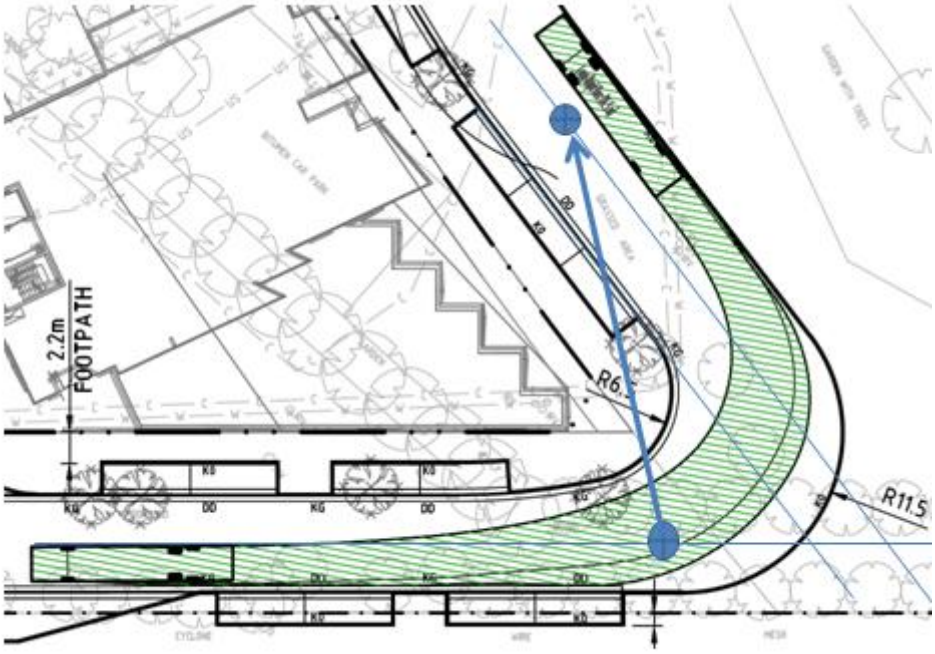


Major road speed (km/h) (See Note 4)	Distance along major road (m) (see Note 6)
40	20
50	30
60	40
70	55
80	65
90	80
100	95
110	115
120	140

Notes:
1. Separation line (undivided road), or right hand edge of right hand through lane (divided road).
2. A check to the left is required at a divided road except where the median is wide enough for a crossing or turning manoeuvre to be staged in the median.
3. Where visibility is limited due to some removable obstruction, (e.g. vegetation or earth bank) attempts should be made to remove the obstruction rather than install a STOP sign.
4. The posted or general speed limit is used, unless the 85th percentile speed is significantly higher.
5. Where the minor road approach is an arterial road this dimension should be increased to 4.5 m.
6. Where checking sight distance the height of both the observer's eye and the object is 1.05 m* except for Queensland and New South Wales where 1.15 m is to be used.
7. If the safety of the surveyor is likely to be a problem, sighting may be taken from the kerb in the minor road, with appropriate adjustments to the sight triangle.
8. The distances in the table along both the minor road and major road are based empirically on the ability of a driver on the minor road approaching the intersection at a speed of 10 km/h or less being able to stop before reaching a conflict point if there is insufficient gap for crossing or joining the major road stream.

Source: AS1742.2 (Draft)

Figure 3.2: Sight distance restrictions requiring use of STOP signs



The issue is more about the ability of northbound vehicles in New Road to slow or stop in time to allow passage of oncoming southbound buses swinging across

the centreline when turning. Again sightlines should be adequate, but the problem is drivers recognising the issue in time. A simple set back Stop line or Give Way line in New Road would have to be so far back (say 15m from the property line extended) as to be frequently ignored, and would probably need to be augmented by a sign "Give Way to oncoming traffic ".

Further investigation of this road layout issue by the Civil Engineer is warranted in detailed design, and may involve the widening of the corner to avoid conflict of buses with on-coming cars.

6.17 Construction Plan In order for TfNSW to ensure unhindered access and egress to the new transport interchange, the following traffic control measures are requested in the Construction Traffic Management Plan: • No construction vehicle parking occurs anywhere on the interchange road except for near the intersection of Hill and Burroway Roads. • Construction vehicles should be parked in such a way that does not impede the access to the interchange for kiss and ride vehicles and buses. • No construction vehicles operate from the interchange road except for constructing the redesigned interchange road (eg concrete pouring trucks). • During the construction period a turning facility at the eastern end of the interchange road that allows 14.5m non-rear steer buses to do a full circle movement safely (not undertake a double movement) is provided. • Consultation with TfNSW and local bus operators through the proposed detailed Construction Traffic Management Plan is required to ensure impacts to public transport is minimised during construction.

The Revised Proposal can comply. Document to be provided in future stage.

6.18 General Comments TfNSW supports the following proposals: • The provision of Special event and clearway conditions applying on Hill Road, New Road and Burroway Road and the interchange during special events and on street parking and loading zones being restricted on Burroway Road and the New Road in order to improve bus and traffic circulation during Major Events. • The encouragement of a minimum of deliveries and other site traffic during Special Events, during construction and operation phases and also the staging of development construction activity to avoid clashes with the largest Major Events.

The Revised Proposal can comply with these conditions.

7 Appendices - Calculations

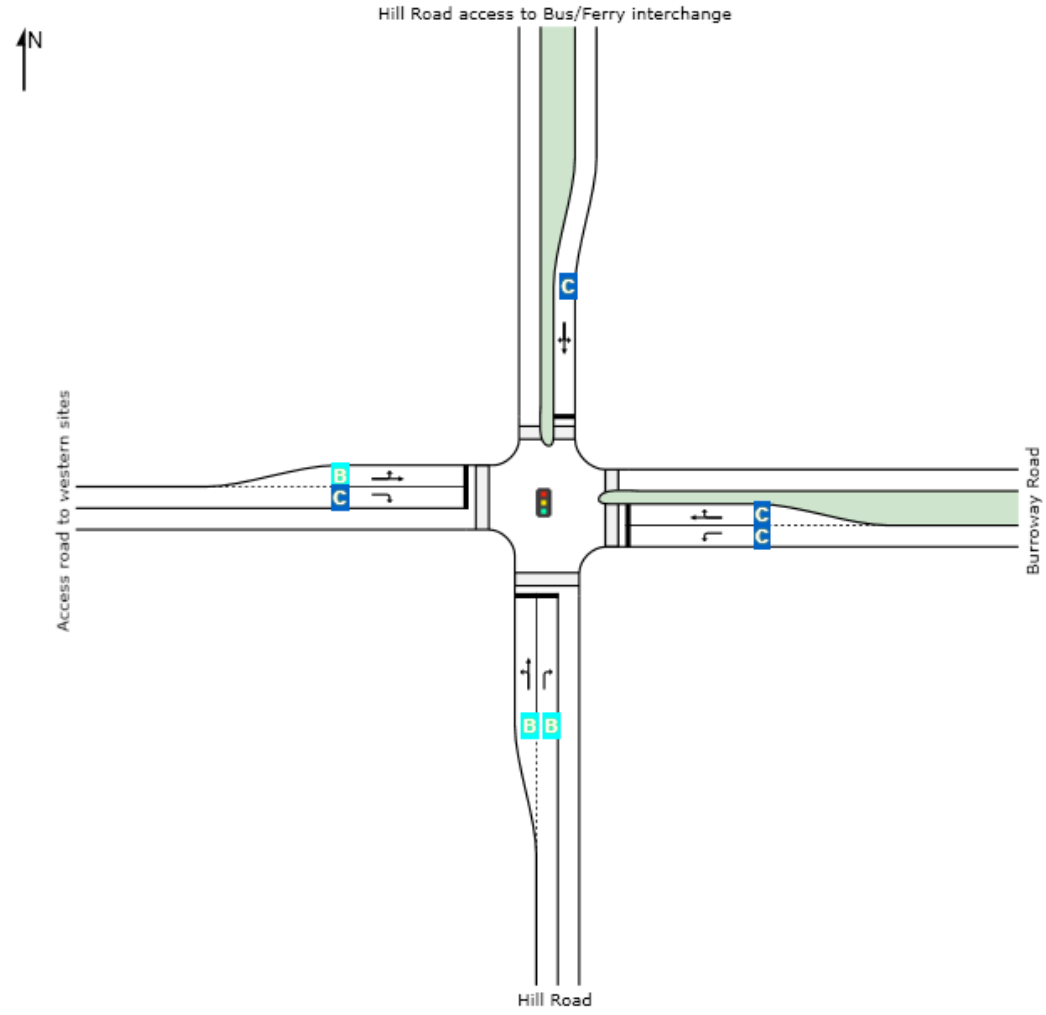
LEVEL OF SERVICE

Site: Hill Road/Burroway Road (signals) Future AM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: AM peak hour, weekday
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	East	North	West	Intersection
LOS	B	C	C	C	C



MOVEMENT SUMMARY

Site: Hill Road/Burroway Road (signals) Future AM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: AM peak hour, weekday
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hill Road											
1	L2	127	2.0	0.201	19.2	LOS B	4.0	28.2	0.63	0.68	45.4
2	T1	45	2.0	0.201	13.7	LOS A	4.0	28.2	0.63	0.68	46.5
3	R2	249	2.0	0.419	24.0	LOS B	7.1	50.8	0.82	0.79	42.0
Approach		421	2.0	0.419	21.4	LOS B	7.1	50.8	0.74	0.74	43.4
East: Burroway Road											
4	L2	606	2.0	0.793	29.2	LOS C	21.7	154.5	0.90	0.89	39.8
5	T1	22	2.0	0.107	31.6	LOS C	1.0	7.3	0.88	0.67	38.9
6	R2	8	2.0	0.107	37.1	LOS C	1.0	7.3	0.88	0.67	37.8
Approach		636	2.0	0.793	29.4	LOS C	21.7	154.5	0.90	0.88	39.7
North: Hill Road access to Bus/Ferry interchange											
7	L2	1	2.0	0.288	36.4	LOS C	3.5	25.3	0.90	0.71	39.0
8	T1	101	2.0	0.288	30.9	LOS C	3.5	25.3	0.90	0.71	39.7
9	R2	1	2.0	0.288	36.4	LOS C	3.5	25.3	0.90	0.71	38.9
Approach		103	2.0	0.288	31.0	LOS C	3.5	25.3	0.90	0.71	39.7
West: Access road to western sites											
10	L2	12	2.0	0.033	21.7	LOS B	0.6	4.1	0.64	0.58	44.7
11	T1	12	2.0	0.033	16.2	LOS B	0.6	4.1	0.64	0.58	45.8
12	R2	369	2.0	0.822	40.5	LOS C	14.1	100.2	1.00	1.05	35.3
Approach		393	2.0	0.822	39.2	LOS C	14.1	100.2	0.98	1.02	35.8
All Vehicles		1553	2.0	0.822	29.8	LOS C	21.7	154.5	0.88	0.87	39.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	33.4	LOS D	0.1	0.1	0.91	0.91
P4	West Full Crossing	53	32.5	LOS D	0.1	0.1	0.90	0.90
All Pedestrians		211	33.6	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

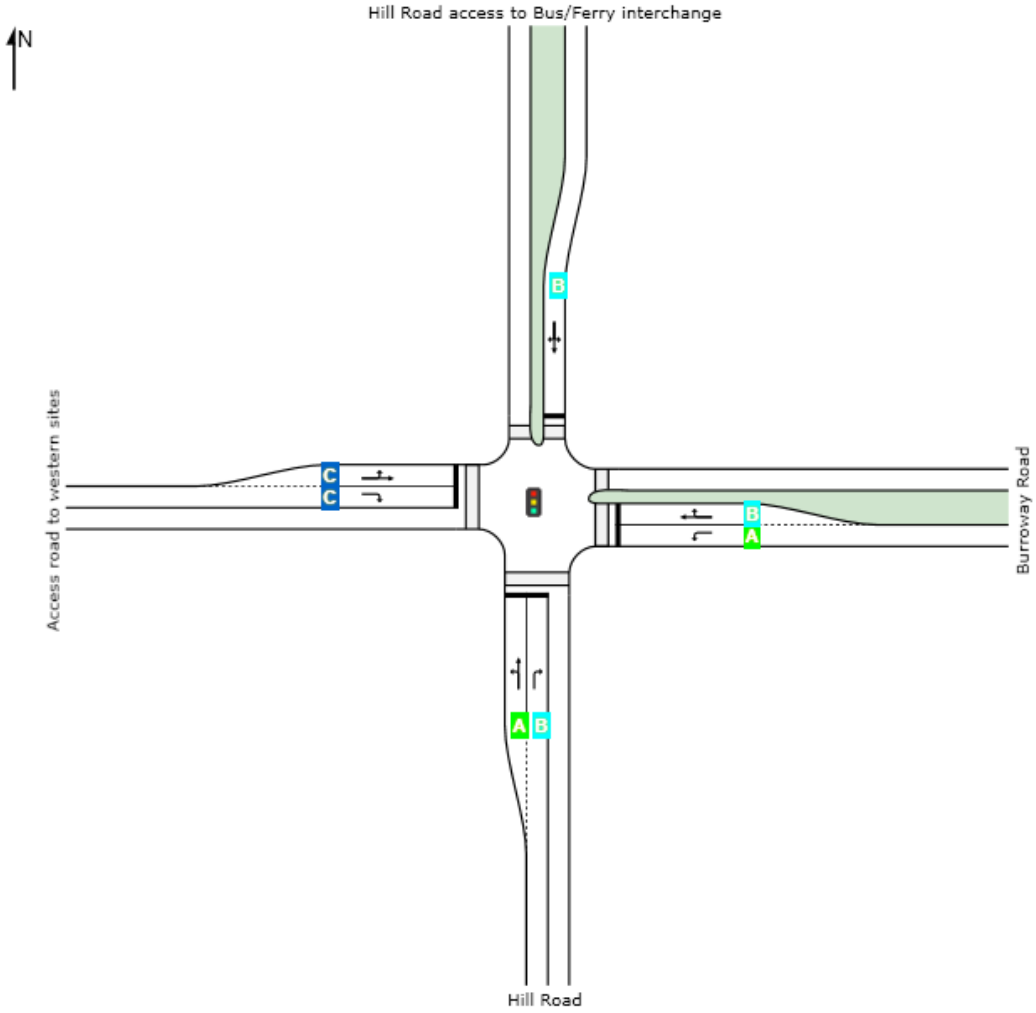
LEVEL OF SERVICE

Site: Hill Road/Burroway Road (signals) Future PM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM peak hour, weekday
Signals - Fixed Time Cycle Time = 70 seconds (Practical Cycle Time)Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	East	North	West	Intersection
LOS	B	A	B	C	B



MOVEMENT SUMMARY

Site: Hill Road/Burroway Road (signals) Future PM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM peak hour, weekday
Signals - Fixed Time Cycle Time = 70 seconds (Practical Cycle Time)Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hill Road											
1	L2	417	2.0	0.445	12.3	LOS A	9.0	64.2	0.54	0.69	49.5
2	T1	112	2.0	0.445	6.7	LOS A	9.0	64.2	0.54	0.69	50.8
3	R2	716	2.0	0.775	20.5	LOS B	16.3	116.3	0.87	0.94	43.7
Approach		1245	2.0	0.775	16.5	LOS B	16.3	116.3	0.73	0.83	46.1
East: Burroway Road											
4	L2	335	2.0	0.318	12.4	LOS A	5.4	38.3	0.50	0.72	48.7
5	T1	22	2.0	0.094	26.2	LOS B	0.9	6.2	0.86	0.65	41.3
6	R2	8	2.0	0.094	31.6	LOS C	0.9	6.2	0.86	0.65	40.1
Approach		365	2.0	0.318	13.6	LOS A	5.4	38.3	0.53	0.72	47.9
North: Hill Road access to Bus/Ferry interchange											
7	L2	1	2.0	0.171	30.3	LOS C	1.9	13.8	0.85	0.66	41.7
8	T1	66	2.0	0.171	24.7	LOS B	1.9	13.8	0.85	0.66	42.6
9	R2	1	2.0	0.171	30.3	LOS C	1.9	13.8	0.85	0.66	41.5
Approach		68	2.0	0.171	24.9	LOS B	1.9	13.8	0.85	0.66	42.5
West: Access road to western sites											
10	L2	12	2.0	0.069	31.4	LOS C	0.7	4.9	0.85	0.66	40.0
11	T1	12	2.0	0.069	25.8	LOS B	0.7	4.9	0.85	0.66	40.8
12	R2	141	2.0	0.621	36.1	LOS C	4.8	34.1	0.96	0.83	36.8
Approach		165	2.0	0.621	35.1	LOS C	4.8	34.1	0.95	0.81	37.3
All Vehicles		1843	2.0	0.775	17.9	LOS B	16.3	116.3	0.72	0.80	45.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90
P4	West Full Crossing	53	27.5	LOS C	0.1	0.1	0.89	0.89
All Pedestrians		211	28.6	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

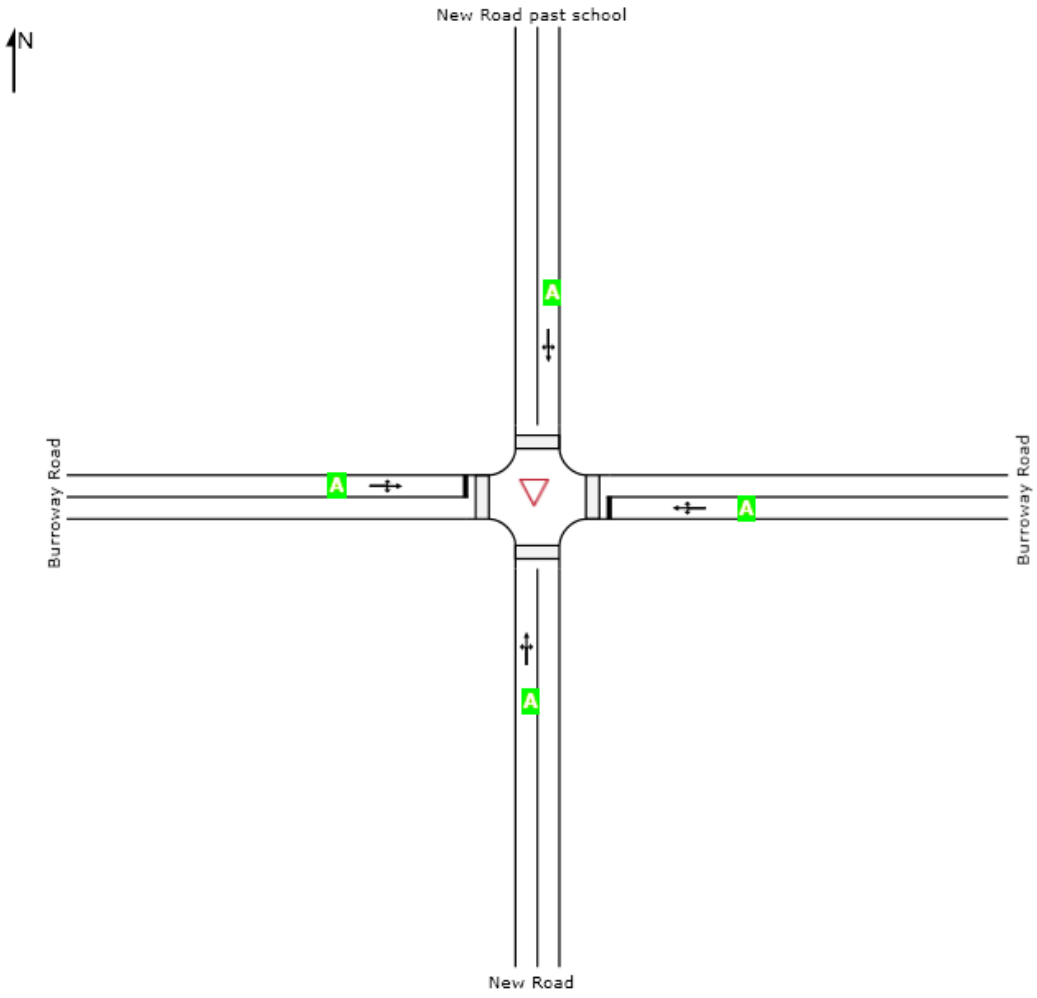
LEVEL OF SERVICE

Site: New Road school/Burroway Road Future AM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: AM weekday peak hour
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	NA	A	NA	A	NA



MOVEMENT SUMMARY

Site: New Road school/Burroway Road Future AM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: AM weekday peak hour
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Road											
1	L2	35	2.0	0.031	3.9	LOS A	0.1	1.1	0.08	0.40	24.0
2	T1	11	2.0	0.031	0.1	LOS A	0.1	1.1	0.08	0.40	35.3
3	R2	11	2.0	0.031	3.9	LOS A	0.1	1.1	0.08	0.40	35.2
Approach		57	2.0	0.031	3.2	NA	0.1	1.1	0.08	0.40	27.9
East: Burroway Road											
4	L2	11	2.0	0.550	9.0	LOS A	4.1	29.4	0.34	0.95	23.2
5	T1	553	2.0	0.550	8.7	LOS A	4.1	29.4	0.34	0.95	23.2
6	R2	11	2.0	0.550	8.5	LOS A	4.1	29.4	0.34	0.95	22.9
Approach		575	2.0	0.550	8.7	LOS A	4.1	29.4	0.34	0.95	23.2
North: New Road past school											
7	L2	11	2.0	0.039	4.0	LOS A	0.2	1.3	0.13	0.42	36.1
8	T1	11	2.0	0.039	0.1	LOS A	0.2	1.3	0.13	0.42	34.3
9	R2	46	2.0	0.039	4.0	LOS A	0.2	1.3	0.13	0.42	25.7
Approach		68	2.0	0.039	3.4	NA	0.2	1.3	0.13	0.42	28.6
West: Burroway Road											
10	L2	31	2.0	0.300	8.3	LOS A	1.3	9.2	0.14	1.02	20.3
11	T1	207	2.0	0.300	8.1	LOS A	1.3	9.2	0.14	1.02	28.2
12	R2	35	2.0	0.300	7.8	LOS A	1.3	9.2	0.14	1.02	20.4
Approach		273	2.0	0.300	8.1	LOS A	1.3	9.2	0.14	1.02	26.4
All Vehicles		973	2.0	0.550	7.8	NA	4.1	29.4	0.25	0.90	24.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

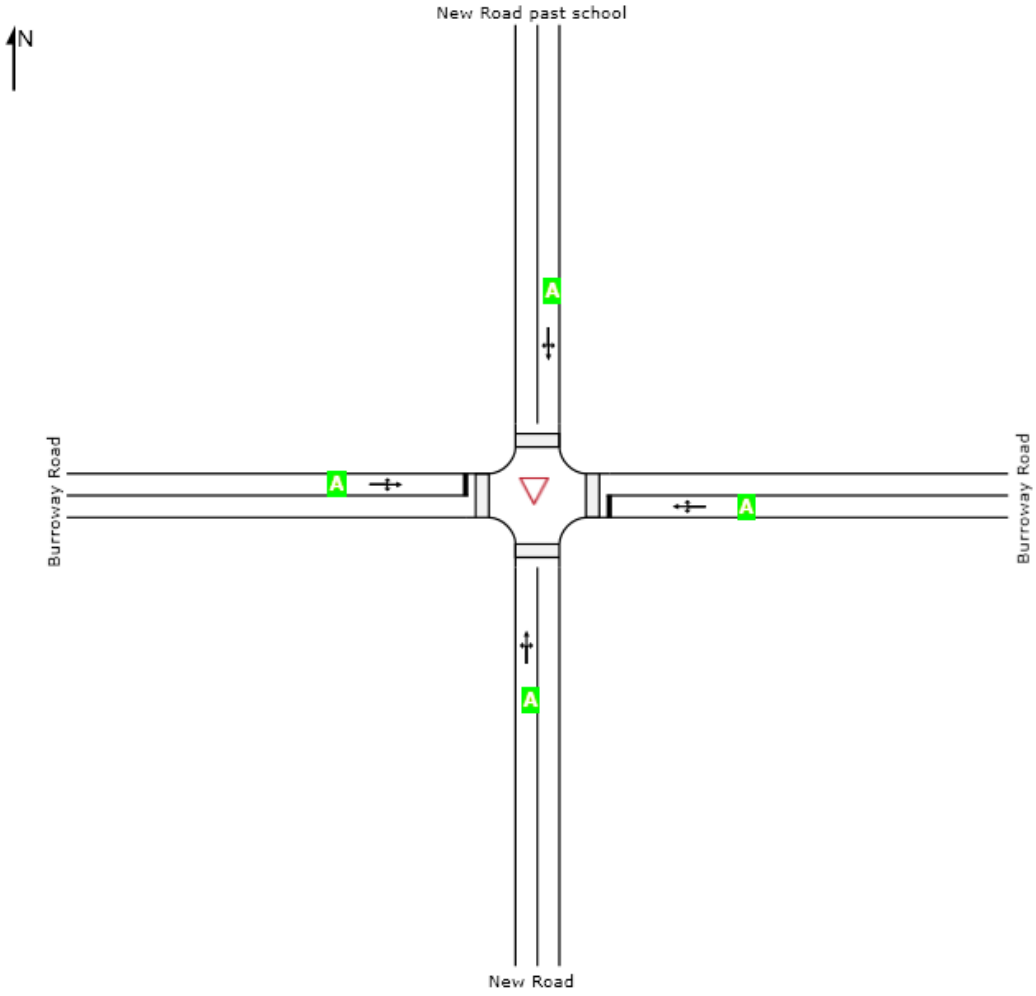
LEVEL OF SERVICE

Site: New Road school/Burroway Road Future PM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM weekday peak hour
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	NA	A	NA	A	NA



MOVEMENT SUMMARY

Site: New Road school/Burroway Road Future PM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM weekday peak hour
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Road											
1	L2	102	2.0	0.068	3.9	LOS A	0.3	2.4	0.09	0.44	23.6
2	T1	11	2.0	0.068	0.1	LOS A	0.3	2.4	0.09	0.44	34.2
3	R2	11	2.0	0.068	3.9	LOS A	0.3	2.4	0.09	0.44	34.4
Approach		124	2.0	0.068	3.6	NA	0.3	2.4	0.09	0.44	25.2
East: Burroway Road											
4	L2	11	2.0	0.271	9.0	LOS A	1.2	8.2	0.23	1.00	23.0
5	T1	228	2.0	0.271	8.8	LOS A	1.2	8.2	0.23	1.00	23.0
6	R2	11	2.0	0.271	8.5	LOS A	1.2	8.2	0.23	1.00	22.7
Approach		250	2.0	0.271	8.8	LOS A	1.2	8.2	0.23	1.00	22.9
North: New Road past school											
7	L2	11	2.0	0.040	4.2	LOS A	0.2	1.4	0.22	0.42	35.4
8	T1	11	2.0	0.040	0.3	LOS A	0.2	1.4	0.22	0.42	33.5
9	R2	46	2.0	0.040	4.2	LOS A	0.2	1.4	0.22	0.42	25.3
Approach		68	2.0	0.040	3.6	NA	0.2	1.4	0.22	0.42	28.1
West: Burroway Road											
10	L2	31	2.0	0.768	12.6	LOS A	13.4	95.4	0.42	1.04	17.2
11	T1	607	2.0	0.768	12.3	LOS A	13.4	95.4	0.42	1.04	24.0
12	R2	102	2.0	0.768	12.0	LOS A	13.4	95.4	0.42	1.04	17.2
Approach		740	2.0	0.768	12.3	LOS A	13.4	95.4	0.42	1.04	22.8
All Vehicles		1182	2.0	0.768	10.1	NA	13.4	95.4	0.33	0.93	23.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

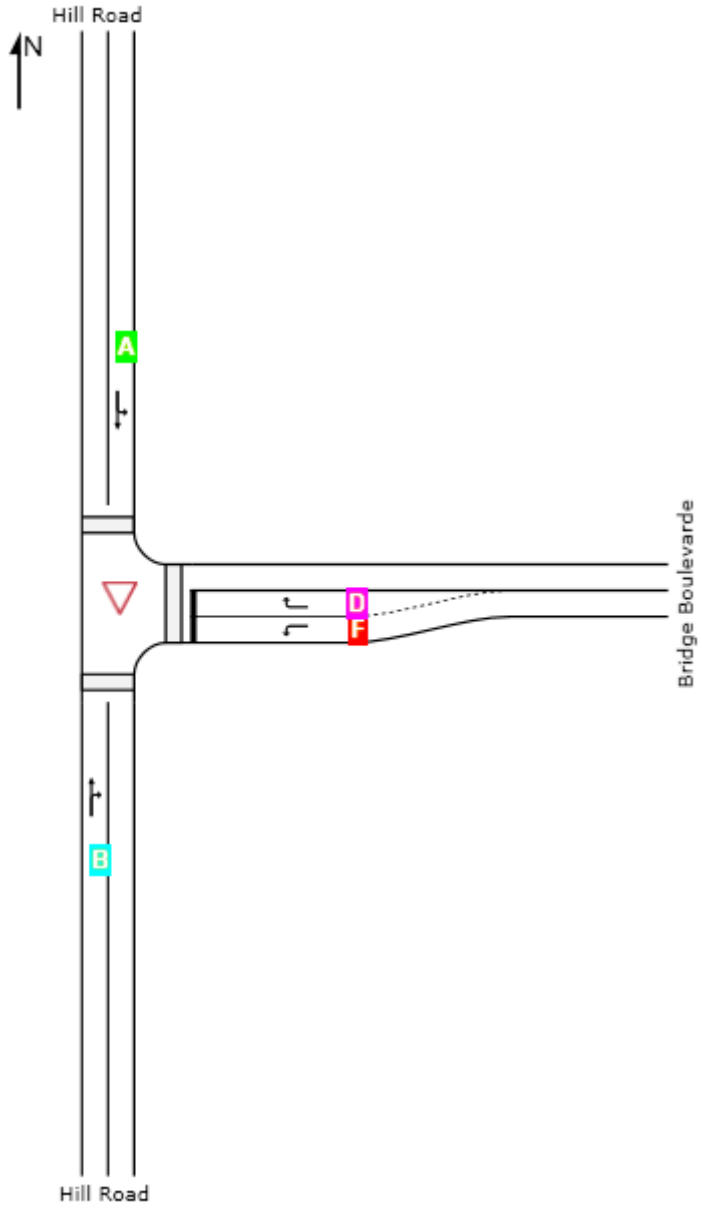
LEVEL OF SERVICE

Site: Bridge Boulevard/Hill Road Future AM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: AM weekday peak hour
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	Intersection
LOS	NA	F	NA	NA



MOVEMENT SUMMARY

Site: Bridge Boulevard/Hill Road Future AM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: AM weekday peak hour
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Hill Road											
2	T1	403	2.0	0.473	19.6	LOS B	7.2	51.5	1.00	0.24	14.3
3	R2	98	2.0	0.473	23.5	LOS B	7.2	51.5	1.00	0.24	13.4
Approach		501	2.0	0.473	20.4	NA	7.2	51.5	1.00	0.24	14.1
East: Bridge Boulevarde											
4	L2	325	2.0	1.228	247.4	LOS F	45.1	321.0	1.00	4.26	1.6
6	R2	23	2.0	0.285	53.0	LOS D	0.8	5.6	0.95	1.02	6.1
Approach		348	2.0	1.228	234.6	LOS F	45.1	321.0	1.00	4.04	1.7
North: Hill Road											
7	L2	23	2.0	0.562	3.9	LOS A	0.0	0.0	0.00	0.01	29.7
8	T1	1058	2.0	0.562	0.0	LOS A	0.0	0.0	0.00	0.01	49.4
Approach		1081	2.0	0.562	0.1	NA	0.0	0.0	0.00	0.01	48.7
All Vehicles		1930	2.0	1.228	47.6	NA	45.1	321.0	0.44	0.80	7.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

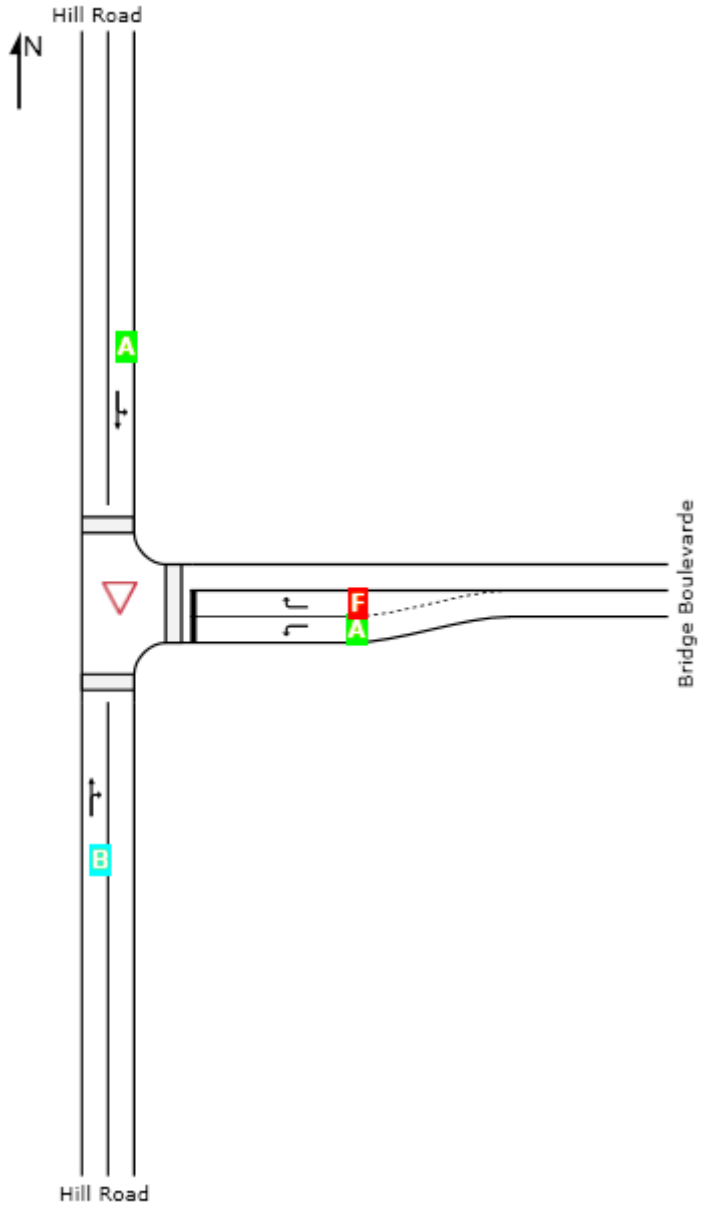
LEVEL OF SERVICE

Site: Bridge Boulevard/Hill Road Future PM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM weekday peak hour
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	Intersection
LOS	NA	F	NA	NA



MOVEMENT SUMMARY

Site: Bridge Boulevard/Hill Road Future PM

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM weekday peak hour
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hill Road											
2	T1	1318	2.0	0.799	19.1	LOS B	21.4	152.1	1.00	0.11	14.8
3	R2	98	2.0	0.799	23.0	LOS B	21.4	152.1	1.00	0.11	13.8
Approach		1416	2.0	0.799	19.4	NA	21.4	152.1	1.00	0.11	14.7
East: Bridge Boulevarde											
4	L2	325	2.0	0.481	13.1	LOS A	2.8	20.0	0.68	1.13	16.4
6	R2	23	2.0	1.793	1150.1	LOS F	10.6	75.7	1.00	1.47	0.3
Approach		348	2.0	1.793	88.3	LOS F	10.6	75.7	0.70	1.15	4.1
North: Hill Road											
7	L2	23	2.0	0.332	3.9	LOS A	0.0	0.0	0.00	0.02	29.7
8	T1	615	2.0	0.332	0.0	LOS A	0.0	0.0	0.00	0.02	49.1
Approach		638	2.0	0.332	0.1	NA	0.0	0.0	0.00	0.02	48.0
All Vehicles		2402	2.0	1.793	24.2	NA	21.4	152.1	0.69	0.24	12.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

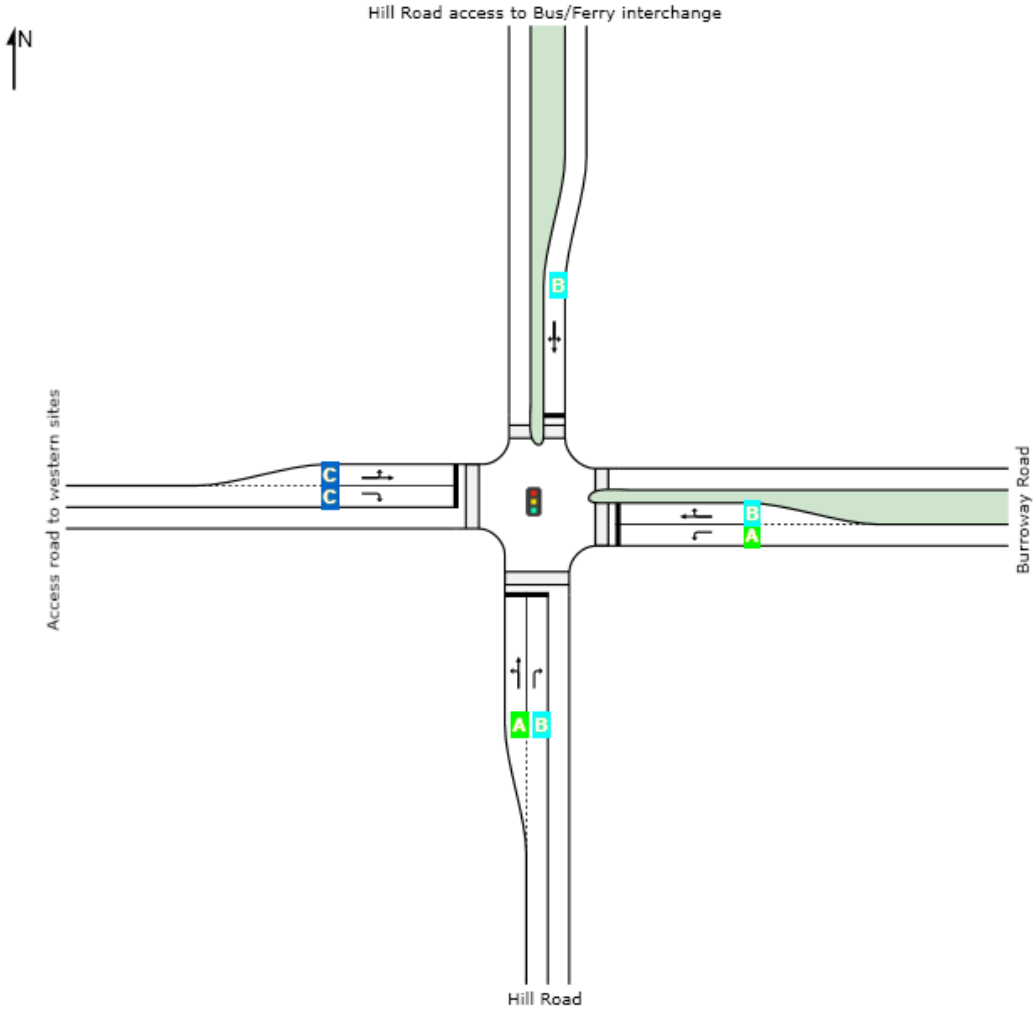
LEVEL OF SERVICE

Site: Hill Road/Burroway Road (signals) Future Special Event

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM peak hour, weekday
Signals - Fixed Time Cycle Time = 70 seconds (Practical Cycle Time)Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	East	North	West	Intersection
LOS	B	A	B	C	B



MOVEMENT SUMMARY

Site: Hill Road/Burroway Road (signals) Future Special Event

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM peak hour, weekday
Signals - Fixed Time Cycle Time = 70 seconds (Practical Cycle Time)Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Hill Road											
1	L2	417	2.0	0.511	12.7	LOS A	10.5	80.2	0.57	0.69	49.2
2	T1	162	32.2	0.511	7.2	LOS A	10.5	80.2	0.57	0.69	50.5
3	R2	716	2.0	0.776	20.6	LOS B	16.4	116.4	0.87	0.94	43.7
Approach		1295	5.8	0.776	16.4	LOS B	16.4	116.4	0.74	0.83	46.1
East: Burroway Road											
4	L2	385	14.7	0.397	13.0	LOS A	6.6	51.9	0.54	0.73	47.9
5	T1	22	2.0	0.094	26.2	LOS B	0.9	6.2	0.86	0.65	41.3
6	R2	8	2.0	0.094	31.6	LOS C	0.9	6.2	0.86	0.65	40.1
Approach		415	13.8	0.397	14.0	LOS A	6.6	51.9	0.56	0.73	47.4
North: Hill Road access to Bus/Ferry interchange											
7	L2	1	2.0	0.173	30.3	LOS C	1.9	13.8	0.85	0.66	41.7
8	T1	66	2.0	0.173	24.8	LOS B	1.9	13.8	0.85	0.66	42.6
9	R2	1	2.0	0.173	30.3	LOS C	1.9	13.8	0.85	0.66	41.5
Approach		68	2.0	0.173	24.9	LOS B	1.9	13.8	0.85	0.66	42.5
West: Access road to western sites											
10	L2	12	2.0	0.069	31.4	LOS C	0.7	4.9	0.85	0.66	40.0
11	T1	12	2.0	0.069	25.8	LOS B	0.7	4.9	0.85	0.66	40.8
12	R2	141	2.0	0.650	36.8	LOS C	4.9	34.7	0.97	0.85	36.6
Approach		165	2.0	0.650	35.7	LOS C	4.9	34.7	0.95	0.82	37.1
All Vehicles		1943	7.0	0.776	17.8	LOS B	16.4	116.4	0.72	0.80	45.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P2	East Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90
P4	West Full Crossing	53	27.5	LOS C	0.1	0.1	0.89	0.89
All Pedestrians		211	28.6	LOS C			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

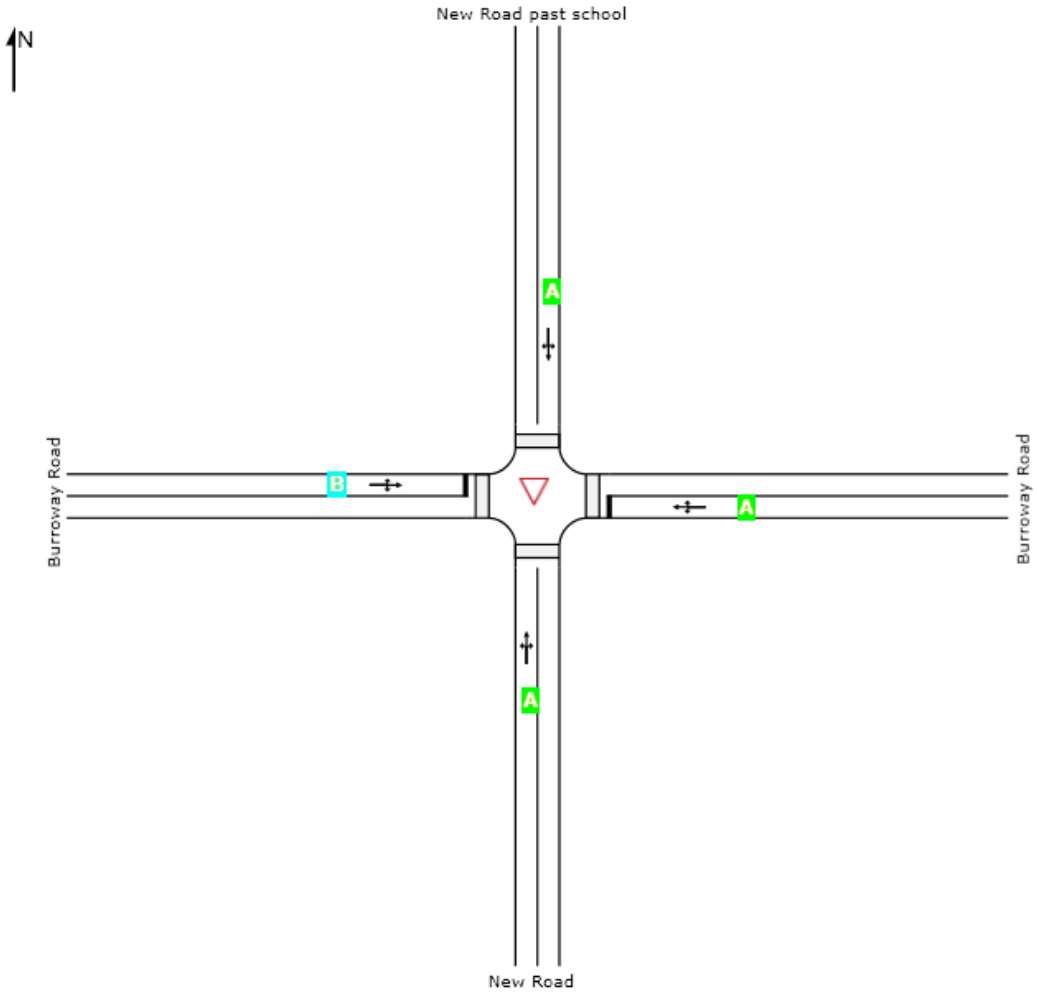
LEVEL OF SERVICE

Site: New Road school/Burroway Road Future Special Event

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM weekday peak hour
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	NA	A	NA	B	NA



MOVEMENT SUMMARY

Site: New Road school/Burroway Road Future Special Event

Scenario: 2023 Cumulative Reassigned + Gen by Development+ New buses
Period: PM weekday peak hour
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: New Road											
1	L2	102	2.0	0.068	3.9	LOS A	0.3	2.4	0.09	0.44	23.6
2	T1	11	2.0	0.068	0.1	LOS A	0.3	2.4	0.09	0.44	34.2
3	R2	11	2.0	0.068	3.9	LOS A	0.3	2.4	0.09	0.44	34.4
Approach		124	2.0	0.068	3.6	NA	0.3	2.4	0.09	0.44	25.2
East: Burroway Road											
4	L2	11	2.0	0.295	9.6	LOS A	1.2	8.9	0.25	1.01	22.5
5	T1	228	2.0	0.295	9.3	LOS A	1.2	8.9	0.25	1.01	22.5
6	R2	11	2.0	0.295	9.1	LOS A	1.2	8.9	0.25	1.01	22.2
Approach		250	2.0	0.295	9.3	LOS A	1.2	8.9	0.25	1.01	22.5
North: New Road past school											
7	L2	11	2.0	0.092	4.4	LOS A	0.4	4.3	0.26	0.44	35.1
8	T1	11	2.0	0.092	0.6	LOS A	0.4	4.3	0.26	0.44	33.1
9	R2	96	53.0	0.092	4.4	LOS A	0.4	4.3	0.26	0.44	23.9
Approach		118	43.5	0.092	4.0	NA	0.4	4.3	0.26	0.44	25.6
West: Burroway Road											
10	L2	31	2.0	0.835	16.2	LOS B	16.7	119.2	0.48	1.19	14.9
11	T1	607	2.0	0.835	15.9	LOS B	16.7	119.2	0.48	1.19	20.9
12	R2	102	2.0	0.835	15.7	LOS B	16.7	119.2	0.48	1.19	14.9
Approach		740	2.0	0.835	15.9	LOS B	16.7	119.2	0.48	1.19	19.9
All Vehicles		1232	6.0	0.835	12.2	NA	16.7	119.2	0.38	1.01	21.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.